SAIFEDEAN AMMOUS

THE GOLD STANDARD

An ALTERNATIVE ECONOMIC HISTORY of the TWENTIETH CENTURY

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Introduction

The invention of bitcoin has kindled interest in monetary history while offering people a historically unparalleled opportunity to experience first-hand the transformative potential of upgrading monetary technology. In 2018, I published *The Bitcoin Standard,* a book that focused on monetary history and monetary economics, explaining the problem of money over millennia in order to illustrate bitcoin's true potential and historical significance. In 2021, I published *The Fiat Standard,* which also focused on monetary history and economics to explain the functioning of fiat money and its far-reaching implications. In 2023, I published *Principles of Economics,* a book that explained the economics of human action and detailed how civilization emerges out of the cooperation of individuals. All three books offered readers a departure from the usual approach of modern economics books, in that they challenged the inevitability and desirability of government-controlled money and illustrated its many devastating impacts to individuals and society. A central theme through all three books is that human civilizational progress is inextricably linked with the hardness of our money: the harder the money is to make, the less its supply will increase over time, the better it will hold its value, and the more it will allow its holder to provide for the future more effectively, decreasing the uncertainty surrounding the future, and causing us to discount the future less. In other words, hard money makes us more future-oriented, lowering our time preference, which is what initiates the process of civilization. As we increasingly value the future more, we defer immediate gratification in favor of long-term rewards. We save our resources for the future, and invest them to increase our productivity. We control our base instincts and passions and subdue them to our reason, which calculates what is in our long-term interest. We cooperate and resolve differences peacefully because we are able to appreciate that the long-term fruits of peaceful cooperation far outweigh the short-term benefits of aggression.

We engage in trade, and build a highly sophisticated division of labor. If practiced over generations, this process of civilization manifests as a continuous increase in the material well-being of a society, with each generation living better than the previous generation.

The obverse is also true, unfortunately. The easier money is to produce, the more its supply increases and its value declines over time, the less it will allow us to provide for our future selves, increasing the uncertainty surrounding the future, and causing us to discount the future more. In other words, easy money makes us more present-oriented, raising our time preference, which is what destroys the process of civilization. As we discount the future more, we consume our resources with little regard for the future. Saving and capital investment decline. We are more likely to act to satisfy our present urges at the expense of our future well-being, since it matters increasingly less. We are less likely to cooperate and resolve differences peacefully, so our division of labor is compromised and with it our productivity. Much of the history of the past century has reflected this civilizational decline. The collapse of society witnessed under hyperinflation is just a faster and more noticeable version of the same process slow fiat inflation brings about.

A contentious thesis for many, yet one that has found support among a growing worldwide readership with more than a million copies sold across 38 languages. I believe much of the books' success is due to their ability to explain to readers many of the phenomena they experience as they use different forms of money. The more I wrote and spoke about the impacts of money on time preference, the more stories I would hear from readers and listeners about their own countries' experiences with inflation and hyperinflation through the century of fiat money. Everywhere has countless stories to tell of the destruction of money bringing about the destruction of economic security and the destruction of civilization.

Pervading all three of my books is a deep sense of historical regret over a world that could have been—a world where money escaped the grip of the state, was chosen freely on the market, and constantly increased in market value, allowing savings, protecting from government and central bank debasement, and limiting government power by restricting its funding to transparent

taxation. Countless times when examining one particular aspect of fiat's devastation of humanity, I would find myself wondering how different things could have been, how much prosperity was lost, and how much human suffering could have been averted. For years, I have found myself drifting off into long thought experiments around the question: What would the twentieth century have looked like on a hard money standard? We can see how consequential the reduction in the value of money is in episodes of hyperinflation, high inflation, and even low inflation. We can see the impact upgrading from an easy money to a harder money has on individuals, as the stories of bitcoiners attest. And we can see how hard money is already showing signs of transforming President Nayib Bukele's El Salvador. Every time I observe one of these phenomena, I wonder how different the world would have been in the past century had it used hard money. In many interviews I would be asked such questions and I would find myself overflowing with ideas for answers, my mouth unable to articulate them at the rate at which my mind produces them. That feeling is what puts fire in my fingers and gets them itching to start writing these ideas, systematically exploring them and elaborating on them, culminating in the production of a book.

It would have been a natural continuation of my first two books on bitcoin and fiat to complete the series by writing a new book stretching back further in time to study the gold standard, its workings and implications to society, and examining questions of time preference, individual freedom, government power, prices, poverty, economic growth, and capital markets in the context of the gold standard of the nineteenth century. But that book was already written in 2001 by the late Swiss banker Ferdinand Lips, under the title of Gold Wars. This was one of the most influential books I've read in my life. It explained the history of the gold standard and its almost mystical positive influence over human society in a remarkably clear manner. That book, more than any other, was the driving influence behind me writing *The Bitcoin Standard* and it inspired many of the critical ideas in it. If I were to apply the ideas of *The Bitcoin Standard* to the historical gold standard, I could scarcely improve upon Lips' masterpiece, which I very strongly recommend reading. I would also recommend Edwin Walter Kemmerer's *Gold and the Gold*

Standard: The Story of Gold Money, Past, Present and Future for a more practical and mechanical perspective on how the Gold Standard worked. Lips, Kemmerer, and many others have already dug through mountains of old data and books to explain to us how the classical gold standard actually worked, but there were many imperfections in the gold standard in the nineteenth century. Even at its best it fell short of the ideal form of a gold standard in which all financial instruments are backed by 100% of their face value in gold in the vaults of the issuer. The classical gold standard still allowed for the creation of money and credit far above the amount of gold held in reserve. What would happen if we had a perfect gold standard? What would the world look like when no entity is capable of making money without opportunity cost? This question, along with the question of what the twentieth century would have looked like on hard money, inspired the writing of *The Gold Standard.*

This book takes my three previous books' ideas on the importance of monetary soundness and applies them to a list of elaborate questions: What would the world look like if we had a gold standard in the twentieth century? What if, instead of downgrading from an imperfect gold standard to the catastrophic fiat standard at the beginning of the twentieth century, the world had upgraded to a better gold standard? Given everything we know about the impact of hard money, just how different would a hard money twentieth century have been? What would life be like with constantly appreciating money and declining prices? What would have happened if governments could not have financed themselves with inflation in the last century, without accountability? How much less blood would have been shed had governments had to fight their wars with their own treasuries without having recourse to inflation to rob all their citizens? How would living standards and wages change? How would the state have evolved? What would have happened to education, technology, politics, and our production of energy?

The Gold Standard attempts to answer these questions with a fictional economic history of an alternative twentieth century in which the fiat money experiment fails in 1915. Since money is pervasive to all aspects of life, I endeavoured to make this as realistic as possible. Rather than simply assuming the monetary system I want and shaping the world around it, I chose to

construct a history which could have conceivably led to this monetary transition taking place, in order to produce realistic historical developments through the century. In considering scenarios for an alternative history, there are many historical junctures where an author could take the liberty of choosing a different outcome from reality, and hence change history. Franz Ferdinand's assassin's gun could have jammed and the conflict between Serbia and Austria would have been averted, preventing the snowball of war that was to consume the planet. Austria's old Emperor Franz Joseph could have easily died a week before his crown prince nephew Franz Ferdinand traveled to Bosnia, making him emperor and potentially causing his modernizing influence to prevent conflict with Serbia and Russia altogether. But such simple changes do not address the underlying historical and economic factors that led to the war, and would thus not offer a convincing rationale for history fundamentally changing. The same governments and central banks that went to war in 1914 could have gone to war a few years later with similar consequences. It was important for me to change something fundamental with the monetary technology of the time to make this story interesting and realistic. Economists of the Austrian school have long emphasized the importance of entrepreneurship in changing history, so this is an Austrian economists' work of entrepreneurial fiction.

The fork of reality from which this book comes begins in October 1910, with an imaginary letter that was to advance development of the aviation industry in the following years. A few entrepreneurs establish an airplane-based international gold clearance service in 1911, but it would not change anything drastic in the world until 1915. Outside of the aviation industry, all of the world's major events remain the same in this story until September 1915, when the fiat money experiment fails irreversibly, and our alternative history truly begins. The years 1914-15 were of extraordinary historical importance, as they gave birth to the monetary system and world order in which we live today. By introducing developments that are not entirely outlandish to the aviation industry, this book derails the fiat money experiment in its infancy and strangles the fiat century in its crib. This book invites you, dear reader, to teleport yourself via the power of imagination to this alternative world, and

think deeply of what it would have looked like.

Part I of this book is based on our real world's history, and it covers the period leading up to 1915. All the historical facts mentioned there are correct, to the best of my knowledge. The alternative history begins in Part II, which details an alternative ending of the Great War and the emerging new world order. Part III discusses the workings of the modern gold standard, and the evolution of the state and banks in the alternative world. Part IV outlines the evolution of living standard, energy, technology, society, and education throughout the century. Finally, Part V of the book provides a comparative study between the economics of our real fiat world and the imagined golden world of this book.

In this pre-release preview sample, the first two chapters are from Part I, the historically accurate part based on our world's real history. Chapters 3 and 4 are from the fictional history of Part II. Quotes that have references are real quotes, whereas quotes without references are imaginary.

PART I

Chapter 1

The Great War

The relative stability of the monetary order from 1873 coincided with the stability of the political order. As the world traded one money, it also approached an ideal of one economic unit, with declining restrictions on trade and reductions in military conflicts. Relations between the major powers continued to improve over time and the prospect of war seemed less and less likely. Britain and France, bitter rivals for centuries, signed the Entente Cordiale in 1904, an agreement delineating British and French colonies in North Africa, preventing conflict between the countries, and leading to growing cooperation between the two empires. Anglo-Russian relationships had also improved with the signing of the Anglo-Russian Convention in 1907, in which Britain and Russia delineated their Asian colonies to avoid conflict.

Britain's relationship with Germany was also improving. Through royal marriages of her children to European monarchs, Britain's Queen Victoria was the grandmother of many royals across the continent, most notably the German Kaiser Wihelm II, whose coronation in 1888 marked an auspicious moment for British-German relations, as he was the eldest of the forty-two grandchildren of Queen Victoria through her eldest daughter Princess Victoria. At his birth, Wilhelm II was third in line for succession of the Prussian throne and sixth in line for succession of the British throne. When Queen Victoria was on her death bed in 1901, Wilhelm II, who loved her dearly, traveled to be by her side. It is said that she passed away in his arms. He carried her coffin at her funeral.

After its victory in the Franco-Prussian war, Germany focused on

consolidating its empire in the European mainland, and Britain and Germany approached the twentieth century with their interests harmonized and the threat of war subsiding. Germany could dominate the European mainland while Britain expanded its empire everywhere else. An alliance between the two great powers was even seriously considered, with Germany eventually rejecting it because they worried Britain's imperial entanglements could drag them to an unwanted war with Britain's historic rivals Russia and France, or the unthinkable horror: both.

From 1890 to 1902, three potential problems emerged in British-German relations. Kaiser Wilhelm II removed Bismarck as chancellor and ignored his advice to avoid pursuing a foreign empire, which inevitably aroused the distrust and discontent of the British, who had the world's biggest empire and did not want Germany competing with them for territories. Wilhelm II also became obsessed with building a navy to support the empire, provoking more animosity from Britain, who had the world's largest and most powerful navy, which controlled the entrance to the North Sea, Germany's naval gateway to the world.

The death of Queen Victoria in 1901 and the ascension of her son Edward VII to the throne added to the friction in British-German relations. Kaiser Wilhelm had a jealous rivalry with his uncle Edward, who had always looked down on him as a young man and his nephew, rather than treating him as an equal ruling monarch of a superpower. Known as "the possessor of the least inhibited tongue in Europe,"[1] Wilhelm had suffered brain damage during birth which caused him to be erratic, impulsive, and emotional, and his behavior created needless tension between Germany and Britain that threatened to sour the increasingly cordial and cooperative international order. In an infamous interview with *The Daily Telegraph* in October 1908, Kaiser Wilhelm's attempts at winning over British public opinion backfired as his outbursts caused increased tension not just with Britain, but also with France, Russia, and Japan. Wilhelm's naval and imperial ambitions alarmed the British, and he grew increasingly concerned that Britain's rapprochement

1 Barbara W. Tuchman, "The Guns of August" (New York: Ballantine Books, 1990).

with France and Russia was meant to encircle and suffocate Germany.

But these fears were alleviated in the second decade of the twentieth century. After King Edward VII died, Kaiser Wilhelm II attended his funeral on May 20, 1910, which helped mend relations with British people and royalty. A popular king at the zenith of his empire, his funeral procession drew an estimated three to five million people, with 35,000 soldiers lining the funeral's route. From across Europe and the world, monarchs packed the palace in the largest gathering of monarchs to date. The astonishing spectacle and sense of cordial solidarity and togetherness suggested the superpowers were entering a period of extended peace and cooperation. Barbara Tuchman immortalized the occasion in a famous passage of her book, *The Guns of August:*

> So gorgeous was the spectacle on the May morning of 1910 when nine kings rode in the funeral of Edward VII of England that the crowd, waiting in hushed and black-clad awe, could not keep back gasps of admiration. In scarlet and blue and green and purple, three by three the sovereigns rode through the palace gates, with plumed helmets, gold braid, crimson sashes, and jeweled orders flashing in the sun. After them came five heirs apparent, forty more imperial or royal highnesses, seven queens—four dowager and three regnant—and a scattering of special ambassadors from uncrowned countries. Together they represented seventy nations in the greatest assemblage of royalty and rank ever gathered in one place and, of its kind, the last. The muffled tongue of Big Ben tolled nine by the clock as the cortege left the palace, but on history's clock it was sunset, and the sun of the old world was setting in a dying blaze of splendor never to be seen again.[2]

The new king, George V, ascended to the throne in 1910 with his first cousin ruling Germany, and his first cousins ruling Russia as Emperor Nicholas II and Empress Alexandra. In 1913, the naval rivalry between Britain and Germany seemed to be over as Germany agreed to keep its fleet inferior

2 Barbara W. Tuchman, "The Death of Jaurès," chapter 8 of *The Proud Tower: A Portrait of the World Before the War: 1890-1914,* 451-515 (New York: Random House, 1966), 1.

to Britain's at a ratio of 10:16. Tensions over the Middle East had also been alleviated in June 1914 when Britain and Germany resolved their differences over the Baghdad Railway.[3]

Tensions were ever-present in the heartland of Europe, where ethnic and religious diversity created many small conflicts that threatened to embroil larger powers. Yet it was not easy to imagine this snowballing into something large enough to draw Britain in. Britain, after all, had no vital interests in the European mainland, as all its interests lay in its overseas empire. "We are fish" Lord Salisbury had famously said to explain his government's indifference to inter-European territorial squabbles and its keen interest in the empire its magnificent navy made possible.

In 1913, Kaiser Wilhelm's daughter Princess Victoria Louise married. Her wedding was also a great gathering of European monarchs, suggesting further dissipation of tensions. Any semblance of Anglo-German tension looked to have disappeared in the fateful final week of June 1914. The German Kaiser had joined the festivities of the annual Kiel Week Regatta, where he inaugurated the new Kiel Canal locks. That year's regatta was a historical occasion, for it saw the invitation of Britain's Royal Navy's Second Battle Squadron, which comprised the four newest and most powerful dreadnaughts in the world. As the German Navy had grown to become the second biggest navy in the world, the invitation of the biggest navy to this occasion signaled that the two navies had found a way to peacefully coexist, and the naval rivalry between them was over. Kaiser Wilhelm, who was bestowed the rank of admiral in the British Navy by his grandmother, wore his British admiralty uniform to inspect the British warships. The evening of Saturday, June 27, saw boisterous parties as British and German sailors visited each other's boats, drank together, engaged in friendly boxing matches, and partied into the morning of the fateful day of June 28. At 6 p.m. on that day, with sailors still nursing their hangovers, news would arrive of the assassination of Archduke Franz

3 R. J. W. Evans, Hartmut Pogge von Strandmann, eds. The Coming of the First World War *(New York: Oxford University Press, 1990)*; Ruth Henig, The Origins of the First World War, 3rd ed. (London and New York: Routledge, 2002 [1989]).

Ferdinand, heir to the throne of the Austro-Hungarian Empire.

The news would take the joy out of the events of the week and cause Kaiser Wilhelm to cut his visit short. He left Kiel the next day. King George then sent a message delivered by the commander of the British squadron leaving Kiel on June 30:

Friends Today
Friends in Future
Friends Forever

It was almost completely inconceivable for anyone involved that these two navies would be at war in a mere five weeks, but that is exactly what happened. It was an astonishing turn of events. Within the space of one week between July and August, Europe went from optimism that Austria and Serbia were going to find a diplomatic solution to their quarrel to an all out war with five major powers in conflict: Austria-Hungary, Russia, Germany, France, and Britain, and thee more powers to follow over the coming months: Japan, the Ottoman Empire, and Italy. To get a sense of just how unlikely this was at the time, note that the Serbian-Austrian crisis had not been mentioned in the British parliament for four weeks after it happened. Hardly anybody had even thought this affair carried any significance for the British. On July 24, British Prime Minister Herbert Asquith wrote to his lover Venetia ""We are within measurable, or imaginable, distance of a real Armageddon. Happily there seems to be no reason why we should be anything more than spectators." [4]On July 27, a day before Austria-Hungary declared war on Serbia, Chancellor of the Exchequer David Lloyd George said there could be no question of taking part in any war, and he knew of no minister who was in favor.[5]

On August 4, Germany entered Belgium, and on August 5, the first battle of The Great War began: The Battle of Liège, which pitted the German army against the Belgian army. Liège fell on August 16, and the German army continued its march through Belgium on its way to France, where one of the

4 H. H. Asquith, In *H.H. Asquith: Letters to Venetia Stanley,* ed. Michael Brock and Eleanor Brock, (Oxford: Oxford University Press, 1985), 123.

5 Martin Gilbert, *First World War* (London: Harper Collins, 1995) 23.

most brutal warfronts in history awaited them against the French and British armies.

On August 12, 1914, the Austro-Hungarian military under the command of General Oskar Potiorek launched its first offensive into Serbia. Hundreds of thousands of soldiers were killed and injured on both sides as Serbia succeeded in fending off the Austro-Hungarian attack. It was one of the greatest upsets in military history. Soon after, on August 17, Russia invaded the East Prussian province of Galicia and suffered large losses in a successful German counter-attack. At the Battle of Tannenberg, which took place the following week, Germany achieved a crushing defeat of Russia, setting Russia on the wrong foot from the start of the war. On May 23, 1915, Italy declared war on Austria-Hungary and opened a new front.

Perhaps no better testament to the senselessness of this war existed than the Christmas truce of 1914, when German and English soldiers on the western front both decided to stop fighting over the Christmas holidays (without having received orders to do so) and crossed enemy lines to socialize and exchange gifts. They even played a game of football together before going back to their trenches and resuming the senseless slaughter. The absurdity of the war was palpable: German soldiers, many of whom had worked in England and liked the country and learned to play football there, were in France to fight the British army of King George V, Kaiser Wilhelm's cousin. Germany had no plans to take over Britain, and Britain had no plans to take over Germany, so neither of these sets of soldiers felt a serious threat from one another. None of the soldiers could quite understand how things spiraled so quickly into large-scale war, nor could the diplomats and intellectuals in the respective countries quite explain that either. The Christmas truce laid bare the truth that these soldiers had nothing against each other, had nothing to gain from fighting this war, and could see no reason to continue it. Whatever rivalry exists between these nations could very well be acted out peacefully on the football pitch at the cost of disciplined training rather than the blood of an entire generation.

In the aftermath of the war, virtually nobody could explain how the major powers had gone to war against each other. There was a sense that this was

a disaster into which the major powers inadvertently sleepwalked. After the assassination of the Austrian crown prince in Sarajevo by Serbian nationalists, Austria seemed overconfident in its ability to bring Serbia to heel. Russians seemed extremely cavalier about smashing the Austrians in defense of Serbia. The Germans, in turn, seemed gripped by paranoia, with Kaiser Wilhelm's demons awakened that the British, French, and Russians were aiming to destroy Germany. Rather than work to avoid a confrontation with the three powers, the Germans seemed to think they could take on France, then Russia, all while Britain kept to itself. The French seemed to have vastly overestimated their ability to fight the Germans and regain Alsace-Lorraine, and the British imagined their entry would decisively and quickly settle the war.

They were all unfathomably wrong.

There is a compelling case to be made that all of the parties deserve part of the blame for their overreaction and instigation. It is easy for the historian to simply cast blame everywhere and virtue signal about peace being good and war bad. Yet there was also a very real historical context in which this tragedy was born, one that has its roots in nineteenth century military conflicts and alliances and in the imperial ambitions of monarchs who had grown callous to the true cost of their ambitions in men and treasure.

As the war headed to a brutal stalemate and the belligerents seemed hell-bent on pursuing war at all costs, financing was to prove the decisive factor in determining the war's outcome. All the major powers of the day were on a classical gold standard. Their central banks held large amounts of gold reserves and issued paper notes and bank credit to their citizens. As war intensified, pressure on these reserves increased across the world because citizens preferred to trust in the immutable laws of chemistry represented in gold over the promises of governments that would do whatever it took to secure what looked like inconsequential victories.

Chapter 2

The Century of Flight

Aviation was the quintessential twentieth century industry, and its history is indicative of the incredibly transformative and unexpected impact of innovations in this century. At the beginning of the twentieth century, most of the world viewed heavier-than-air flight as an impossibility. Mass transportation through flight in heavy machines seemed impossible to most, since the flight of balloons was predicated on them being lighter than air. With their limited speed, range of motion, and elevation, there was not much practical or commercial use for balloons as modes of transport. Instead, they were mainly used for entertainment or surveillance.

For as long as man has existed, he has looked enviously at birds and wondered how he could emulate them. Countless great minds through history attempted to fly. Hot air balloons and man-carrying kites have existed in China since the first and sixth century AD, respectively. Many daredevils and engineers attempted to fly by jumping from elevated heights with constructed wings. Leonardo da Vinci thought extensively of the problem and crafted many designs like fixed-wing gliders, rotorcraft, parachutes, and ornithopters, which are planes that fly by mimicking the movement of a bird's wings. In *Codex Atlanticus,* Leonardo wrote, "Tomorrow morning, on the second day of January, 1496, I will make the thong and the attempt." It is unclear what happened with the attempt, though Leonardo obviously survived it.

Early progress in flight came from hot air balloons, which first flew successfully in 1783 in France. In 1852, Henri Giffard invented the airship and flew fifteen kilometers with it. In the late eighteenth century and first half of the nineteenth century, Sir George Cayley in England designed the first successful human glider and provided the first scientific treatment of the

problem of aviation. There were countless scientists, engineers, and amateurs preoccupied with the problem throughout the nineteenth century, mainly in Britain, France, and the United States. Building on Cayley's work, Frenchman Alphonse Pénaud flew the first stable fixed-wing airplane model a distance of forty meters. After centuries of failed flight attempts by emulating birds' wings or rotating vehicles, Alphonse Pénaud was the first to successfully implement the idea of a propeller to move the airplane forward and fixed wings to levitate it upwards, which continue to be the operating principles of all jet planes today. Pénaud would produce children's toys from his design to try to raise money to build real jets, which required very high costs at a time when engines were still new and expensive. His toy making and fundraising were not enough to secure the resources he needed, and Pénaud would commit suicide in 1880, but his ideas lived on. Germany's Otto Lilienthal made many successful gliding attempts, which gained him fame, and he documented his technical improvements in his 1889 book *Birdflight as the Basis of Aviation.* In 1894, French-born American engineer Octave Chanute wrote *Progress in Flying Machines,* which proved vital for future aviation pioneers, accurately and meticulously documenting all the ideas put forward to achieve flight on both sides of the Atlantic.

Standing on, and taking off from the shoulders of these giants were two bicycle mechanics from Dayton, Ohio: brothers Orville and Wilbur Wright. As young boys, their father had gotten them a model toy airplane based on Pénaud's design. It captivated them. They were both skilled with machines, and they owned and operated a highly successful bicycle business. But what distinguished them from others was their methodical and meticulous scientific approach to examining the technical aspects of flight. In 1900, they studied the climate across America and consulted meteorological authorities to identify the spot that would have the ideal winds for their flight experiments. They identified the town of Kitty Hawk on Bodie Island, North Carolina, because of its wind and soft sand. They traveled to that desolate spot and camped away from civilization, getting brutalized by mosquitoes, but never wavering from their mission and calling. They prioritized safety and gradual improvements and kept returning to Kitty Hawk for repeated

experiments with gliders. In late 1901, they built their own small wind tunnel in their workshop and experimented with 200 different wing designs. In 1902, their glider had effectively solved the problem of flight control by inventing three-axis control, which allowed a pilot to control the movement of the aircraft and which remains in use in all aircraft today. Whereas most aviation enthusiasts were focused on power and achieving liftoff, the Wrights focused on control and moved to the power question only after perfecting the elements of control. They employed the same methodical experimentation to the design of engines and had their shop mechanic Charlie Taylor build an engine for them out of aluminum. They fitted the engine on their newly built Wright Flyer, and on December 17, 1903, Orville Wright became the first man to fly on a heavier-than-air machine.[6]

Outside of some very isolated tribes, everyone alive today was born to a world where flight is possible and common. Very few people stop to think of just how improbable modern flight actually is—and how unfathomable it was before it became a reality. No less an authority on engineering and physics than Lord Kelvin wrote in 1896, "I have not the smallest molecule of faith in aerial navigation other than ballooning, or of the expectation of good results from any of the trials we heard of." No less a visionary than Thomas Edison said in 1895, "It is apparent to me that the possibilities of the aeroplane, which two or three years ago were thought to hold the solution to the [flying machine] problem, have been exhausted, and that we must turn elsewhere." Mathematician and astronomer Simon Newcomb famously said in 1903, "Aerial flight is one of that class of problems with which man will never be able to cope."

The question had been so conclusively settled that *The New York Times,* on October 9, 1903, wrote:

> "The flying machine which will really fly might be evolved by the combined and continuous efforts of mathematicians and mechanicians in from one million to ten million years — provided, of course, we can meanwhile eliminate such little drawbacks and embarrassments as the

6 David McCullough, *The Wright Brothers* (New York: Simon & Schuster, 2015).

> existing relation between weight and strength in inorganic materials. No doubt the problem has attractions for those it interests, but to the ordinary man it would seem as if effort might be employed more profitably."[7]

Camped out in Kill Devil Hills, North Carolina, Orville Wright clearly had no access to *The New York Times,* as that day's entry in his diary read, "We unpacked rest of goods for new machine and set to work on upper surface." Instead of "one million to ten million years," it took Orville and his elder brother Wilbur sixty-nine days from the day of the Times' prophecy to fly their plane on the first manned flight in history.

Such was the improbability of the Wright's feat that it took years for the rest of the world to believe that it had actually happened. *The London Times* was still writing in 1906, "All attempts at artificial aviation are not only dangerous to human life, but foredoomed to failure from the engineering standpoint." And in 1907, Britain's Minister of War, Lord Haldane, exasperated by the failure of the British army's attempts at flight, privately remarked that airplanes would never fly.

In France, news of the Wright Brothers' flight was received with a mixture of incredulity, indifference, and intrigue. There were no official bodies documenting their attempt at flight to confirm their outlandish claims, and the Wright brothers didn't help their credibility by maintaining secrecy about the design they used to achieve their feat. Besides, it was not believable that two obscure bicycle mechanics from Ohio were the first to fly when aviation was a thoroughly French industry. France was where the balloon industry was thriving and where motorized balloons were beginning to offer possibilities of flights covering long distances. And it was in France where heavier-than-air flight was making the most progress.

In 1891, a young, rich Brazilian by the name of Alberto Santos- Dumont came to France at the age of eighteen to pursue his dream of flight. He'd achieved spectacular feats with motored balloons and was now working on a heavier-than-air flying machine not dissimilar to what the Wright brothers

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7 *The New York Times,* October 9, 1903.

had been using. In 1906, Santos-Dumont was able to fly his aircraft for 220 meters, which was the first flight supervised by neutral parties. For many in France, this was considered the first human flight, as they refused to acknowledge the Wrights' earlier attempts. But in 1908, Wilbur Wright came to France with his latest jet, the Model A. He demonstrated the superiority of their aircraft to French rivals and silenced the doubters. He signed an agreement with the French manufacturers La Compagnie Generale de Navigation Aerienne to produce the Wright Model A aircraft in France. By the end of 1908, the Wrights' plane could fly an incredible 124 kilometers.

All over France, young engineers and daredevils had been obsessed with flight like nowhere else in the world. Perhaps the most enthusiastic and capable among them was Louis Blériot. The charismatic entrepreneur, adventurer, and bon-vivant had invented the first practical headlamp for cars and made a fortune manufacturing and selling them to the nascent car industry. In 1900, at the age of twenty-eight, he was financially secure enough to dedicate himself to his dream of aviation, which had blossomed after he saw the aircraft of another French aviation pioneer, Clement Ader.

Blériot's early aircraft either failed to fly or came crashing down. He was involved in a large number of serious crashes, though he miraculously emerged alive from them all, ready to go again, earning a legendary reputation for tenacity, resilience, ferocity, and good luck. The French press often mocked him, but he was like a honey badger, astonishingly emerging unscathed time and time again, against all odds, without ever caring about the hatred he received. Blériot was not the sort of man to be cowed by the skepticism and mockery of the lazy; he was thick-skinned, determined, capable, and resourceful. His workshop would keep churning out better airplanes, and on July 25, 1909, he used his Blériot XI aircraft to achieve a historic first in aviation: he crossed the Channel from France to Britain. The achievement won him a £1,000 prize from *The Daily Mail,* but more importantly, it boosted demand for his planes. He would ramp up his production, but like other French aviation pioneers, his hands were tied by the threat of lawfare from the notoriously litigious Wright brothers.

In 1906, the Wright brothers obtained a patent for a "Flying Machine"

thanks to their system for controlling airplanes which had made flight possible. With this patent, the Wrights shifted their focus away from making and improving airplanes to suing airplane-makers for patent infringement. They went after many of the producers of airplanes and the innovators of flight in the US and in Europe. The Wrights had indeed come up with the system of control that made flight possible, but many other aviators had introduced great improvements to speed, safety, range, control, and reliability. Instead of all these talents being unleashed to innovate and experiment, they were preoccupied with lawsuits. It was a terrible shame for human progress that the brightest minds in aviation spent more time in the years 1909 and 1910 thinking about legal matters than engineering matters. With all the pioneers of aviation engaged in legal battles against each other, progress was slow. Airplanes were still slow, unsafe, short-ranged, and unreliable, and demand consisted mainly of eccentric rich daredevils using planes for thrills.

Octave Chanute expressed the sentiments of most aviation enthusiasts on January 23, 1910, when he said in an interview:

> I admire the Wrights. I feel friendly toward them for the marvels they have achieved; but you can easily gauge how I feel concerning their attitude at present by the remark I made to Wilbur Wright recently. I told him I was sorry to see they were suing other experimenters and abstaining from entering the contests and competitions in which other men are brilliantly winning laurels. I told him that in my opinion they are wasting valuable time over lawsuits which they ought to concentrate in their work.[8]

[[Note: everything in the previous two chapters is from reality. The next chapters are fictional alternative history]]

8 Octave Chanute to Wilbur Wright, Letter, January 23, 1910, https://invention.psychology.msstate.edu/inventors/i/Wrights/library/Chanute_Wright_correspond/1910/Jan23-1910.html

PART II

Chapter 3

Blériot Transport Corporation

In another world, aviation might have been crippled by the threat of lawfare, but fortunately for our world, aviation was emancipated. In November 1910, Chanute decided to write a detailed letter to the Wright brothers explaining his misgivings in detail and giving them his honest thoughts regarding how best to move forward.

> Dear Wilbur and Orville,
> I hope this letter finds you well. I have received with annoyance the news that you are in court again, this time hoping to stop French engineers from "copying" your aircraft design. As I have told you before, I find it utterly distasteful, crass, self-destructive, and impudent for engineers to try to use the strong arm of the law to prevent others from emulating their achievements. No man has ever built anything without relying on the efforts of many men before him. It was me who came up with the idea of using the strut-wire braced wing structure. You took that idea from me, and yet it never crossed my mind to attempt to take you to court. On the contrary, I flew down to Kitty Hawk and did everything I could to help you implement the design as efficiently as possible, in the hope that you might achieve flight. It was not your idea to combine a rotating propeller with wings to achieve lift-off, Alphonse Pénaud came up with that idea, and it was a toy with this design of his, gifted by your father to you as children, which sparked your entire interest in flight. It was not your imagination that invented the gliders you used, that was the work of Lilienthal, who never considered suing you for copying it.

It was not you who invented the engine that drives the propeller, or the fuel that runs it, or the metals and fabrics needed to make an airplane work.

You took a momentous step forward by being the first to achieve controlled flight, but it was merely one step in humanity's long march, a step that would not have been possible without the infinite steps that preceded it, all the way from the invention of fire until my strust-wire braced wings. And it is a march that will surely continue with more engineers and inventors improving upon what you and I built in ways we cannot imagine. You could not have made your step without those who preceded you, so you should not use the law to ban those that follow you from taking more steps. Such a move not only fails on a moral basis, I also strongly believe it fails the market test. In the long run, you will be able to build better, faster, and safer airplanes if you let people build on your ideas than if you hamper them. The world has many more engineers than you, and even if you were the smartest of them all, you will not be able to come up with a tiny fraction of the ideas that the rest of the world's engineers can come up with. Letting the world use your ideas means many potential improvements to your ideas which you yourself can benefit from, and it will mean you can use the many ideas of others. In the spirit of scientific cooperation and our shared desire for human progress, you should set the example for the industry to encourage the free exchange of ideas.

As a courtesy for all the help others have been to you, I implore you to drop all your court cases and get back to your workshop. You are engineers and builders, and engineers belong in workshops, not in courtrooms with criminals and lawyers. The world will benefit immensely more from what you produce in workshops than what you do in courtrooms. Your ingenuity, place in history, and first-mover advantage are unassailable, and you can channel these toward building better airplanes, benefitting from the improvements others make to airplanes to offer the world the best airplanes. There are infinite opportunities for bringing flight to various fields of human commerce, and I hope you make the most of them. There are millions worldwide who travel long distances by boat, train, car, or foot, and would pay

> dearly to fly instead. There are countless merchants who would pay to have their goods delivered by plane. There are countless banks who eagerly await faster forms of settlement than national central banks. You will not capitalize on this demand by taking others to court. If you continue to try to use the courts to bludgeon other inventors, you will stymie human progress while sinking into irrelevant bitterness. I have spoken to Dumont, Blériot, and all the major French aviators and obtained their solemn promise that they will never sue you for patent infringement if you drop this lawsuit. I believe a new cooperative way is possible for our industry.
> For my sake, for your sake, and for the sake of humanity, get back to your workshop!
> Sincerely,
> Octave Chanute
> 10 November 1910

Orville Wright put the paper down and stared blankly at his brother Wilbur. Chanute had struck a nerve, and it was the most sensitive nerve of all. Wilbur and Orville had barely spent any time in their workshop over the past year. The patent court cases had consumed and hollowed them—as men, inventors, businessmen, and engineers. They hadn't made any improvements to their airplane models in that whole year, all while reports were flooding in about pilots and engineers achieving seemingly impossible feats and making all manners of improvements that seemed unworkable to them. Aviators were making progress faster than the Wrights' lawyers could sue them.

The Wright brothers had a very strong desire to attempt several of the designs they had heard of—and many ideas for how to improve upon them. But that was not possible because their days were spent with lawyers trying to get the state to sanction anyone building airplanes for violating their patent. Rather than continue pushing the boundaries of what humans were capable of, the brothers now found themselves pushing back human progress in the hope they could get the state to help them squeeze a few more dimes from their competitors. The youthful excitement and boyish mechanical curiosity the two brothers once possessed had taken them from a bike repair shop to

making history as the first humans to fly—but that seemed like ages ago. They missed the thrill they got from camping for weeks in Kitty Hawk. They felt like they had aged three decades in the five years since their first flight. Worse, they'd become the smug and self-entitled conservative figures of authority they had always detested, the type who could never build anything but derived all pleasure from preventing others from building. Their days were spent meeting lawyers, writing letters, and hiring private investigators to spy on their competition. They missed the stubborn stains of engine lubricant oil on their hands, the deafening symphony of roaring engines, the sweet aroma of burned gasoline, and the sight of each other exhausted and falling asleep on the workshop floor at the end of a long night of work. They missed the loud, foul mouths of their shop helpers, and they couldn't stand their lawyers' endless monotone droning.

> "I do miss that workshop," Wilbur said wistfully after a long silence.
> "I really miss not knowing lawyers. In retrospect, the days I spent outside of the legal system were the highlight of my life."
> "I wish we could keep those court cases going while we get back to the workshop to make better planes."
> "I wish so too. But lawyers are very expensive and dangerous, and if you're not on top of them, they could cost you very dearly."
> "I admit I have asked myself this question before, and today Chanute has brought it up again: Why should we even care that others are copying us? Let them build their own airplanes. We will make better airplanes. There is far more demand for airplanes than our workshop could possibly meet. We invented the airplane, and they will always have to catch up to us if we focus on pushing ourselves and making our planes better. Why do we want to stop them from innovating?"
> "Because if they copy our design and make a better airplane, they'll make more money than us."
> Wilbur replied: "The planet has a billion and a half people on it, but it doesn't have 100 working airplanes. Are we really so insane as to imagine we would become the only authority allowed to produce airplanes through government fiat? There will be infinite demand for airplanes, and the more time we spend in courts, the less time we'll spend in the

> workshop capitalizing on our advantage, and the more we are allowing others to inevitably overtake us."

Orville had no answer to his brother. He put the papers on his desk away and started packing to go home. Wilbur soon followed. The next morning, Wilbur woke up and decided to forgo his office suit and instead opt for his old workshop overalls. He drove to the workshop and was unsurprised to find Orville already there, also in his overalls. It had been months since they were last in the workshop together, though it felt like just yesterday. They slipped back into their old routine, picking up all the loose ends and unfinished tasks they had been neglecting for months. In their natural habitat, the brothers didn't even need to talk to communicate effectively, whereas in the office, they struggled to express simple ideas to one another. Lions roar, birds chirp, wolves howl, and lawyers talk—but engineers build. The native language of an engineer is his product. Description and explanation all seem futile next to a working product of the human mind that demonstrates what was thought impossible before. And perhaps never in the history of humanity had an inventor produced an object that spoke louder than an airplane: the dream of humanity for eons of observing birds, the dream that had killed countless dreamers, finally achieved.

Around noon, a messenger arrived at the workshop. He had been sent by their office assistant, who was puzzled as to why they both hadn't showed up. The lawyer, after all, had been waiting for them to attend their planned meeting. But they both seemed unconcerned. They told the messenger to tell the lawyer they wouldn't be able to make it to the office, and that he'd be welcome to come see them in the workshop. Their lawyer showed up later that afternoon, and the brothers told him they were no longer interested in pursuing their court cases. They settled his bill and immediately felt rejuvenated, like old men given their younger bodies again. They were no longer terrified of the prospect of someone building something better than their planes; they were now excited about what they themselves could build.

The Wrights abandoning their lawsuit was huge news for the intrepid pilots, mechanics, and entrepreneurs involved in the nascent aviation industry, particularly in France. The period from 1907 to 1910 had been dominated by

legal battles between the Wrights and their many competitors. When news of the termination of the lawsuit reached France, the excitement was palpable. Plane builders were now free to tinker with their designs. Investors could finance the builders without worrying about being ruined by lawsuits. Entrepreneurial imaginations would run wild with airplane-based business ideas.

Nobody was happier with the news than Louis Blériot. The Wrights' lawsuit had hampered his progress and soured his typically jovial mood, so its dropping put a spring in his step and a sparkle in his eyes. He went home every day excited to share his ideas with his wife, like a child telling his mom about his school day. He knew airplanes were going to be a huge deal, but his success with headlights made him keenly aware that airplanes could not succeed unless serious market demand drove their development. While other aviation pioneers were focused on technical improvements and exhibitions, Blériot knew the best way to spur innovation and improvements would be to stimulate serious market demand for a product. His crossing of the English Channel had increased demand among a few rich adventurers, but a real commercial application was needed.

He had considered building aircrafts for travel or joyrides, allowing people to see the world from above for the first time. He considered building airplanes optimized for moving commercial cargo or mail. He meticulously ran the numbers on these ideas, but they were not financially viable. Humans were too heavy for this to work. The cost of making airplanes for passengers would be very high and the cost of each ride would likely deter most of those not already deterred by the safety concerns. He looked at commercial goods, but most goods, like humans, were too heavy to move economically over airplanes. He realized that this idea would only work for goods that held a lot of value and little weight. This simple thought sent him down a rabbit hole that would change the world forever.

The Wrights' lawsuit's demise encouraged many people to enter into the world of aviation. Many of France's entrepreneurs and adventurers were hard at work trying to improve on their airplane design. To stimulate more innovation, Guy de Polignac established the Pommery Cup in 1909 to offer a

lucrative prize for the pilot who could fly the longest distance.[9] On April 30, 1911, Jules Védrines managed a 336 kilometer flight from Paris to Poitiers. A few days later, he collected the inaugural Pommery Cup at an event hosting Europe's top pilots and aviation engineers.

Blériot was there on a mission. Aviators had come a long way since his flight across the Channel, and so had he. But he was no longer interested in competitions, trophies, publicity, or media. He meant business—and he knew business would be what would catapult flight, not adventures or trophies.

During the ceremony, Blériot spoke to each of the seven pilots present and told them he wished to meet with them over an important matter after the ceremony. Given his wealth and his stature in the aviation industry, not a single one of them missed the meeting. Henri Farman, Bedel Villacoublay, Pierre Dacourt, Ernest Guillax, Marcel Brindejonc des Moulinais, and the Germans Bruno Langer and Karl Ingold all attended. After they all sat down, Blériot launched into a speech:

> Thank you all for staying here and joining me. Congratulations to Jules, and hard luck to the rest. I wanted to meet with you because I have a serious proposition for your consideration. I have been thinking very rigorously of how to improve aviation, and I've concluded that the only thing that will really make an impact is finding significant commercial demand for aircrafts. While I appreciate the excellent efforts of the organizers of the Pommery Cup, and I realize it is providing an incentive for the improvement of aircrafts, it cannot compete with commercial applications in spurring innovation. When someone finds a way of making money from airplanes, there will be a giant pot of gold available to everyone who makes an improvement to airplanes, as it will mean higher productivity and better margins, and it will dwarf anything you can win in a competition like this. It is one thing to build things for fun; it is an entirely different thing to build something for capitalists to use in production. The latter will scale much faster and will work more efficiently and safely.

9 "Domaine Pommery – Hill of Saint Nicaise," Union des Maisons de Champagne, https://maisons-champagne.com/en/houses/heritage/rheims-and-surrounding-area/article/domaine-pommery-hill-of-saint-nicaise

My proposition for you is that instead of being amateur adventurers, let's use our talents to become successful entrepreneurs making the world a lot better. Instead of competing for trophies like children, let us all build something that will secure our children financially, along with their children.

I have thought long and hard about the killer app of flight, and at this point, I believe it is in the transportation of gold. For the conceivable future, gold is the only thing valuable enough to pay for its weight in an airplane. And there is demand for fast final settlement of gold. The train and the car have moved goods very quickly, and banks cannot keep up. Rather than settle with one another directly, banks now have to rely on central banks to clear and settle payments between them. This is extremely time-consuming and creates problems for business, as I experienced repeatedly.

The root problem with conventional banking is all the trust that's required to make it work. The central bank must be trusted not to debase the currency, but the history of central banks is full of breaches of that trust. Banks must be trusted to hold our money and transfer it, but they lend it out in waves of credit bubbles with barely a fraction in reserve. You must remember that if it is not your vault, then it is not your gold. You only own a promise from the vault owner that he will grant you gold if you ask for it. This does not inspire confidence. As an engineer, I need certainty, and I am growing increasingly wary of having to trust my wealth in the hands of institutions that are acquiring increasing power over me.

I'm developing a new peer-to-peer gold clearance system reliant on airplanes. It's decentralized, with no central bank because everything is based on fast clearance. We are going to build a fleet of the world's fastest and most reliable aircraft, piloted by the world's best pilots,

> and we will build a peer-to-peer gold clearance network that allows banks, corporations, and individuals to trade gold with one another without having to go through central banks. Our clients will sleep easy knowing they control their own gold and that they do not have to trust shady central banks to not engage in risky financial shenanigans. We will push aviation onwards and upwards to unimaginable heights with the revenue we make. We will build planes that cross the Atlantic. We will make airplanes so abundant that even the poor will be able to afford them.
>
> I want you to look at what Henry Ford did with the car industry and imagine this in aviation. He made the Model-T, and when it generated a lot of revenue, he reinvested in capital goods to make production cheaper and more prolific, allowing him to meet the demand of an ever-increasing base of customers. We are on the cusp of an explosion of automobiles thanks to Ford's genius. By making the car commercially viable, Ford increased demand for cars infinitely. I want to do the same for airplanes, and I need you to help me, and I intend to make it worth your time.
>
> Our airplanes will be ready to take off from anywhere and land anywhere. We will fly in pairs of aircraft to ensure we have backup if something goes wrong with one aircraft. I will require you to be fully dedicated to this job. No more competitions and acrobatics, no more stunts and showboating; it's time to get serious. You will be given an equity stake in the company as well as a steady monthly income of 500 francs each. You have one week to give me your final answer. I am now happy to take any questions.

The pilots were stunned by Blériot's audacity. They had all thought of themselves as daring and brave for being some of the first pilots, but this was a whole other level of bravery. It made their aviation feats look like child's play.

After a long silence, Farman said, "There is no way they will let us do

this. These central banks are not going to allow competition."

"Central banks work just fine for the central banks and their owners, and they cannot even conceive why others might want to use something different. They are too old and decrepit and comfortable to even imagine what airplanes will accomplish. But even if they can understand it, how can they stop us? We are not going to be dealing with them in any way, so we don't need them for anything. Our planes can take off from any empty field and land in any empty field around the globe. By the time they see our planes, we will be out of the range of their guns. Nobody has ever managed to shoot down an airplane and it will be a long time before anyone can figure out how to do it. They don't have an infinite money printer to fund a police state to go after us. The only thing they can do is cry harder."

"What if they criminalize financial settlement outside of banks?" Farman said.

"That is incoherent. Doing so would criminalize you paying in cash at your local cafe. Trading physical gold is no different from any other form of trade. Airplanes carrying gold are no different from any form of transportation carrying goods. It would have to be some absurdly totalitarian government that would specifically try to criminalize the use of jets for transfering gold. They'd have to have a literal money printer to fund something like this. But they don't. They are still on a gold standard and only have a small margin for inflation. By the time they understand what is going on and the ramifications and then try to enforce any kind of ban on us, we will likely have already made a fortune and built a giant fleet. We will have major industrialists and financiers using our services, and they will push to protect us. With their central banks undermined, these governments won't have much financing to enforce such totalitarianism. And if they do—well, it's better to be rich asking for forgiveness than to be poor asking for permission."

"I'm not convinced. This is too risky and stressful," said Guillax.

"Flying is risky and stressful, and yet you're doing it for trinkets and attention from women. I'm offering you the chance to fly for something

> meaningful. Something that will change the world!"
>
> "No, thanks. I'm happy with my trophies, trinkets, and women. I'm out," said Guillax.
>
> "Have fun staying poor!" said Blériot.

The rest of the pilots were far more intrigued and interested. Within a week, they had all confirmed to Blériot their participation.

As the pilots left the meeting in the Paris evening, a letter from Blériot arrived at the Wright brothers' workshop in the Dayton afternoon. This letter explained Blériot's idea to them and asked for their cooperation. Blériot offered to come to the United States to meet the brothers and discuss it in more detail. The brothers were surprised by the letter, but they gave it serious thought. They knew Blériot had the capital to attempt something this audacious, and accepting his proposal would give them the resources necessary to expand their workshop and produce at scale. This was far preferable to courtroom battles over intellectual property.

The offer seemed too good to be true. They had always enjoyed engineering but hated the business side of it. Their foray into attempting financial success through patents and licensing had been a stressful ordeal, and Wilbur's health had begun to suffer from the travel. They had been back in their workshop for six months—back to work on improving their Model B—and felt reinvigorated, especially Wilbur. Now they had one of France's richest men ready to bankroll them and allow them to work with their hands all day and not worry about investors, patents, lawyers, and courtrooms. They telegramed Blériot to signal their interest and to invite him to come visit, then spent the next two months thinking of how to develop their aircraft.

Blériot arrived in Dayton in July of 1911 and stayed with the Wrights. The lawsuit nastiness had subsided, and instead a cordial spirit of cooperation existed between the men. Chanute was right: there was far more to be gained from cooperation in conquering the skies than from legal battles. Blériot had shipped a Blériot XI aircraft with him, and the three men spent three weeks going over every last detail of it and the Wrights' airplanes. Blériot was amazed watching the scientific experimentation method the Wrights deployed to

everything. It was also quite useful that they'd spent years studying their competitors so closely, as it meant they were familiar with all the developments in the US aviation industry. The Wrights enjoyed the depth of knowledge and entrepreneurial instinct Blériot had developed in the automobile and aviation industries. European aviation—French, in particular—had overtaken American aviation in the past year or two thanks to the Wright's lawsuits' stronger crippling effect on US aviators. There were far more airplane makers in Europe, and they had exchanged knowledge and experience more freely. That gave Blériot a large vocabulary of improvements and solutions to potential problems. He could think of every detail both from the angle of its engineering suitability and its potential commercial success. With their familiarity with aviation on both sides of the Atlantic, and their technical genius, the three men set about on the mission of making man truly fly free.

By the end of their three weeks together, Blériot and the Wrights produced a working prototype of Lightning, the most technically advanced airplane in the world. On 1 June 1911, it flew its maiden flight in Ohio, with Blériot at the helm. It could reach a speed of 320 km/hour, and possessed a range of 1,800 kilometers and the capacity to carry two pilots and 100 kilograms of load. It was a technical miracle, and it was made possible by the harvesting of the best ideas from aviation from across the world.

After successfully flying Lightning, Blériot and the Wrights agreed to start a new joint venture, Blériot Transport Company (BTC), which would build Lightning jets and deploy them in the clearance of gold. Blériot would own 51% of the stock of the company, the Wright brothers owned 25% of the stock, and the remaining 24% were divided equally between 24 pilots recruited from across the United States and Europe. The Wrights immediately began work on building a factory in Dayton, and Blériot returned to Paris where he also built one. Both factories would produce 4 jets in 1911, and a further 8 jets in 1912.

On January 9, 1912, the first BTC transaction took place when a Lightning jet carried eight bars of 400-oz gold between a bank in Paris and a bank in Lyon. The next week, America's first BTC transaction took place when a Lightning jet took off from the headquarters of the Standard Oil of New

Jersey, and landed in Cleveland, where it delivered 8 bars of gold to the Standard Oil Company of Ohio.

There was little fanfare around BTC at its launch, outside of aviation circles. The idea seemed completely unworkable. Why would anybody pay for the expensive transport of physical gold when their local bank could move credit obligations? To the extent that academic, governmental, banking, or media authorities discussed BTC, it was to dismiss it with ignorant and snarky haughtiness. Central bankers, from their perch atop the universe, could not possibly see BTC as a threat to their business. So what if a few people had cleared payments directly without going through their central bank? Clearly such a system could not scale to make a dent in the central banks' business.

Skeptics mocked the use of such brilliant machinery and so much fuel for the arcane and ultimately superfluous economic task of moving sterile bars and coins of gold. Money and banking were inextricably intertwined with the state, experts said, and central banks would continue to be relied upon to ensure the safety of banks and the soundness of money. Central banks worked fine, and their proponents argued they were responsible for ameliorating the financial crises caused by greedy bankers. They relentlessly mocked BTC and its supporters for needing—and wanting—economic catastrophe to succeed, and they repeatedly reassured themselves that no such catastrophe was possible. "There aren't enough paranoid cranks to pay for Blériot's fuel," wrote one Financial Times columnist. The New York Times, on the other hand, dedicated several articles to bemoaning what it saw as an unconscionable waste of fuel for no reason.

But business was surprisingly brisk for the Blériot Transport Company, and the number of flights continued to steadily rise. By the end of 1913, its twelve aircraft flew around 3,000 kilometers every day, delivering gold across Europe and the US. Their main clients initially were entrepreneurs and industrialists moving gold within their business, or trading it with other businesses. These companies enjoyed that they did not have to rely on banks to save on time and mitigate risk.

The Standard Oil company had been broken up into 34 companies in 1911, and these came to increasingly rely on BTC for their transactions. The

companies had oil fields, refineries, and offices across the United States and Canada and immediately saw the value in being able to move their money between their businesses without having to rely on expensive, slow, and unreliable banks. The panic of 1907 had left the very conservative John D. Rockefeller paranoid about leaving his wealth in banks or relying on them for his transactions. He had always liked to keep substantive cash on hand to protect against crises and to allow him to capitalize on emerging opportunities.[10] Yet, amidst the panic of 1907, he found himself worried about the fate of the banks he dealt with. Worse, he had to work with his arch rival J.P. Morgan to bail out so many bankrupt businesses and banks with loans. "They always come to Uncle John when there's trouble"[11] is how he wistfully described the episode. But he did not enjoy it. He wanted his wealth to be independent of the increasingly risky banking system. So he invested in building his own gold vaults across the country and used BTC to move his money between them.

Several banks relied on BTC to offer their clients faster money transfers between large cities like Paris and London or New York and Boston. These banks could offer quicker clearance and faster access to liquidity, which was a particularly popular option for many of the growing number of smaller banks popping up all over the United States.

Banks, corporations, royals, and central banks outside of Europe and the US turned out to be great customers paying top prices for BTC transactions. After all, BTC was more reliable than the Bank of England or the Bank of France, and it allowed its customers to keep their gold on hand rather than ship it halfway around the world. By the spring of 1914, BTC jets had reached Mexico, Eastern Europe, North Africa, Arabia, Persia, and even India, China, and South America. In 1913, BTC doubled their fleet by producing twelve jets on each side of the Atlantic. And in 1914, demand was so high that Blériot ordered the production of 48 aircraft, taking the fleet to 96 by the end of the year.

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10 Ron Chernow, Titan: *The Life of John D. Rockefeller, Sr.* (New York: Vintage Books, 2004 [1998]), 537–61.

11 Ron Chernow, Titan: *The Life of John D. Rockefeller, Sr.* p.

In June 1914, a BTC Lightning made the first airplane journey across the Atlantic, flying from London to New York via Edinburgh, Reykjavik, Narsarsuaq in Greenland, and St. John's, Newfoundland.

The start of the Great War in late July 1914 was a boon for business. Individuals, companies, and banks had started to fear for their money in central banks. They now saw the value of an apolitical medium for the transfer of value across international borders. The world's richest all wanted to extricate their wealth from the grip of central banks consuming it to finance carnage. Blériot realized this was a great opportunity to solve a real problem for the market while simultaneously financing the expansion of jet production. He ordered another twenty-four aircraft into production, with their deployment expected in August 1915. What seemed like paranoia on the part of Blériot in 1911 was now revealed as genius foresight. He had studied history and economics, and he knew that people eventually learn the value of verifying rather than trusting and of holding their own money rather than holding promises. Many had doubted him, but he now stood on the verge of securing an enormous fortune, helping countless people secure their wealth, and changing the course of history.

Chapter 4

Capital Flight

The wiles of generals, the bravery of soldiers, and the wisdom of diplomats were all powerless in bringing an end to The Great War. It was, instead, the genius of entrepreneurship and technological innovation that saved the world from untold carnage and devastation. The economic and political history of the twentieth century was inextricably tied to the miraculous technological invention of the airplane, and one cannot understand the history of the twentieth century without understanding the pivotal role played by aviation in transforming monetary technology.

In another world, where BTC did not exist, most people would have had to comply with their regime's edicts and keep using their depreciating bank notes while wondering why prices were rising. The war could continue for years as governments confiscated the gold and people continued to work for and earn depreciating currency. But with BTC, people were free to not comply. It was primarily the industrialists, engineers, and entrepreneurs who complied the least; they understood what a suspension of redemption meant. They knew that a solvent bank would never have a reason to suspend redemption because it could satisfy all its creditors and continue operating successfully. They knew that emotional appeals to patriotism could not mask economic reality. The only possible reason to suspend redemption was that the bank's liabilities exceeded its reserves at the current gold to pound exchange rate. Leaving money in the bank was akin to playing Russian roulette—only with more bullets added to the gun's chamber with each ensuing round until no empty chambers are left and complete loss is guaranteed.

Blériot's business partners and the modern industrialists were first to use his services. The automobile and aviation industries traded with one another across international borders without having to resort to central banks. As the war raged on and more restrictions were put in place, demand steadily increased. Old money became anxious about the banking system. They increasingly demanded to keep gold on hand and wished to rely on BTC for trade. Most important, perhaps, was that BTC had freed people from having to turn in all their gold to the banks in response to the pleas of their governments.

By the end of August 1915, merchants in Britain had started to offer a discount for payment in gold rather than pounds. With that discount factored in, prices had barely moved in terms of gold. But when measured in paper pounds, prices seemed to be rising quickly. The financial fate of citizens from then on was a positive function of their intelligence—and an inverse function of their susceptibility to government propaganda. There has perhaps never been a more effective program of financial eugenics, richly rewarding the financially literate and severely punishing the gullible.

By August 1915, BTC had scaled to 150 Lightning jets and gold transfer prices had more than doubled since inception. Still, it could not keep up with demand. BTC was the only mechanism in the world for free peer-to-peer international trade and represented the only method for gold holders to keep custody of their gold and also be able to send it abroad. A parallel international economy based around physical gold clearance and settlement had begun to take shape. Banks outside of Europe—those reliant on the Bank of England or the Bank of France for their international trade—were some of BTC's biggest clients. Businesses relying on BTC (and on banks relying on BTC) had practically saved themselves from the financial destruction of the war. They held hard money and performed very frequent settlement with local and foreign counterparts. They were not being robbed to finance war. As prices began to rise in national currencies but stayed constant in gold, people wanted to exchange their paper for gold. Gradually, and then suddenly, the fiat currencies collapsed.

The Bank of England had prided itself on its adherence to the sacred

exchange rate of £4.75 per ounce of gold. While that rate was still enforced nominally, it was dead in practice, as it was not possible to obtain gold at that rate from the Bank of England. On the black market, the pound had dropped to almost £5 per ounce of gold by the end of August 1915. It then reached £7 by the middle of September and crashed all the way to £28 by the end of September. The British public were livid. They weren't alone. The same process was playing out in France, Germany, Austria, Italy, Russia, and the Ottoman Empire. The major powers were all being weakened systematically due to the decline in the value of their currency. They could no longer spend with impunity, as they had always expected. Their gold reserves were depleted and their paper money was increasingly worthless. The grand plans of kings and generals were all based on the expectation that their central bank would continue to perform the alchemy of the classical gold standard by granting them credit, but that was all based on their citizens having no way to trade their gold other than through the central banks, forcing them to leave most of it in the bank. BTC turned these plans to dust.

The advancement of aviation had another major technological impact: the development of aerial bombardment as a weapon of war, which allowed for an unprecedented level of destruction. The first year of war witnessed the aerial bombardment of all the capitals of the belligerents, bombings that usually targeted essential and economically important infrastructure. This immense destruction had exacerbated the financial crises of the major powers, reduced the value of their currencies, and arguably hastened their demise.

By the end of September, a permanent encampment of people stood outside the headquarters of the Bank of England. They demanded gold for their paper pounds. But the Bank of England had almost no gold reserves left. It had sent some of its last ingots to the US weeks earlier to secure weapons, and it was now counting on its banks and post offices to collect more gold from the British people to continue securing weapons for war. They had not expected this monetary awakening and had no idea what to do.

The protestors quickly grew in numbers, and the police were growing increasingly unable and unwilling to confront them. On Tuesday October 5, 1915, with hundreds of thousands of protestors camped outside, a section of

the crowd managed to break into the Bank of England and loot it. The crowd ransacked the entire building, rifling through every last drawer and file. They smashed all the vaults and found no gold. The Bank of England's managers and employees removed their three-piece suits and remained in their undershirts in an effort to pretend to be part of the mob and escape.

A similar reckoning was taking place across all European powers. Each country's central bank had engaged in the same kind of inflationism, and BTC had allowed their peoples to escape them all. In Germany, France, Russia, Turkey, and Austria, the local currency also collapsed. All the central banks had been rendered bankrupt, most Europeans had lost their life savings, and millions of soldiers and civilians had died, yet nobody could see any good reason for the carnage. The anger was palpable. Rioting was only quelled by the announcement of public full criminal investigations. The next year would bring to the fore incredible and barely believable stories of the secret steps that brought the world to the Great War while destroying the major powers' currencies, militaries, and an entire generation of young men.

Surprisingly, the financial panic had spread across the Atlantic. The US banking cartel and its nascent Federal Reserve foresaw a great opportunity to profit from war lending to European powers, particularly Britain, whose central bank was collecting large amounts of gold to ship across the Atlantic as collateral. This came to a sudden stop in September with the collapse of the Bank of England and the demise of the pound. The Federal Reserve bank was already unpopular with Americans, who viewed it with suspicion given its secret origins. As news of financial panic in Europe began to spread in the United States, American distrust of the Federal Reserve and the large banks began to increase. Americans began to withdraw their gold from the larger banks and move it to smaller local banks—or keep it at home. The smaller banks began to move away from the Federal Reserve, keeping most of their reserves on hand and relying on Blériot jets for final clearance. Major industrialists began to pay their workers directly in physical gold and silver to avoid using banks or banknotes. They also used Blériot's Lightning aircraft to settle debts between one another. With the Bank of England unable to supply British gold, and with the American public taking its gold out of the banking

cartel, the American banking cartel was doomed.

On the western and eastern fronts of the war, things started to slow down. Military leaders, aware of the financial problems they faced, immediately pared down their more aggressive military plans and reverted to a more conservative, defensive posture. They did not know how long they would need to make do with their existing supplies, nor were they certain their governments could resume military procurement with broken central banks. The smarter soldiers understood that a collapse in currency meant that it was only a matter of time before the government could no longer afford to give them weapons and food. Desertions started to become significant in September 1915. By December, a majority of soldiers had deserted their army units and returned to their homes, where military recruiters were no longer actively looking for them, as the military recruiters had stopped getting paid and stopped doing their jobs. The intensity of fighting subsided almost entirely by December. There would be no more grand charges and epic battles. The trenches became mostly empty and military leaders sought to try to secure the territory they held rather than conquer more. On many fronts, both sets of militaries would withdraw away from the battlefield to more secure territory to avoid costly fighting.

Outside of Europe, all the countries that were on the gold exchange standard witnessed their gold reserves disappear in the Bank of England's financial black hole—all to raise funds for an insane war with no purpose or rationale. These banks now needed to find a new way to settle with the rest of the world, and that was Blériot's Lightning jets. His business kept on booming, and his fleet expanding. As the guns went quiet and the soldiers deserted their fronts, the wheels of commerce and peaceful production began to turn again. International trade began its return to pre-war levels. Merchant ships started traversing the Mediterranean, North, and Black Seas again as the belligerent navies' biggest boats were either docked in the safety of their home harbors, or lay on the ocean floor, usually as victims of aerial bombardment.

The average citizen in the warring countries began to reestablish normality in his life. But in the capitals, royal palaces, and parliaments of the major powers, the old normal was gone for good. The economic, military, and political catastrophes that befell the belligerents demanded explanation, retribution,

and reform. Thorough public investigations would reveal all the sordid details of how the devastating Great War came about. The great powers' central banks would not survive the war, and their empires would soon crumble. The decentralized international clearance of gold reserves through airplanes would become the basis of a new global monetary system. The modern gold standard was more reliable, more efficient, permissionless and open to anyone worldwide, and it would transform the world economic order, redraw the map of the world, reshape the concept of government, and define the history of the twentieth century.